Heat Pumps (HP) Can Cut Your Carbon Footprint And Utility Bills

Home heating and cooling may be your largest source of the greenhouse gases (GHG) that cause climate disruption. To cut your carbon footprint and save money, Croton's Sustainability Committee is encouraging a transition to heat pumps when replacing heating, cooling, or water heating systems. To see if a heat pump is right for your home, read on. But first…

Help Croton Win A $5,000 Grant

If we are able to identify at least 5 Croton HP installations occurring after January 4, 2022, we will win a $5,000 State grant to pay for more public electric vehicle (EV) chargers in the Village.

If you buy (or just sign a contract to install) any type of heat pump after January 4, 2022 please let us know at info@sustain-croton.org.

Please help your Village get more grant funds by reporting your purchase to us. No strings attached!

Heat Pumps 101

Imagine an air conditioner (A/C) that could heat as well as cool a room. That's a heat pump (HP). Instead of just pulling heat out of a room (or whole house) and releasing it outdoors, a HP can also pull energy from a cold place – at any time of the year – and convert it to heat, using only electricity. Compared to an electric baseboard heater, it can provide the same warmth using less than 1/3 as much electricity.

All heat pumps can cut your carbon footprint, i.e., the amount of climate-disrupting greenhouse gases (GHG) for which you are responsible. But some types may not make economic sense (i.e., pay off in a reasonable time) in some existing homes, nor are they do-it-yourself projects. A qualified contractor, a building permit, and plans may be needed to ensure an acceptable installation.

Three Types of HPs

- A **heat pump water heater** (HPWH) looks like a taller electric domestic hot water (DHW) heater (a water heater that instead uses gas, oil, or propane and has a flue pipe coming out its top). But compared to a standard electric DHW heater, a HPWH provides as much hot water, at the same temperature, while using only ~1/3 as much electricity. It pulls heat from indoor air, e.g., from a boiler or furnace room, or from a basement whose temperature is at least 45 F. In basements, it also dehumidifies the air, removing excess moisture that might otherwise cause mold and/or odor problems. Watch a video at https://www.efficiencymaine.com/at-home/water-heating-solutions/heat-pump-water-heaters/

Three models of HPWH

- An **air-source heat pump** (ASHP) works like a reverse A/C. It can be mounted on an interior wall to serve one room, or as a central whole-house unit that uses existing air ducts. In both cases, the

indoor fan unit connects to an outdoor compressor/condenser. Watch a video at https://www.youtube.com/watch?v=lH4g9fLSxPI

- A **ground-source heat pump** (GSHP) pulls heat from the ground. Even in winter, the earth just a few feet down maintains a constant temperature. A GSHP uses a fluid circulating through buried sealed piping, and an indoor compressor/condenser. It heats and cools at a lower cost than an ASHP. Watch a video at https://www.youtube.com/watch?v=qV48cX4d-WY

Wall-mounted ASHP

What Type Makes The Most Sense For Your Home?

That depends on details specific to your home, and financial incentives that cover part of the cost. While all heat pumps will reduce GHG emissions, not all significantly reduce operating costs. Find a good overview at https://cleanheat.ny.gov/assets/pdf/CHC-SFR-HP-buyingguide-br-1-v3_acc.pdf

GSHP and zone valves

A HPWH is most appropriate when replacing an electric DHW heater that is at least 10 years old, i.e., approaching the end of its useful life. At present (2022), Con Edison offers a $1,000 rebate. A federal tax credit of $300 is also available. Together, they may cover most of the typical product cost (roughly $1,500). Installation cost (roughly $500, depending on existing conditions) should be obtained from written contractor proposals. Based on available incentives, replacing an electric DHW heater with a HPWH may pay for itself in 5 years or less, depending on hot water usage (e.g., 3 or more occupants). Financial savings are less if water is heated with oil or propane, and minimal against natural gas.

A whole-house (i.e., central) ASHP or GSHP may be best when a homeowner is already looking to replace old and/or failing forced air (i.e., ducted) HVAC equipment, or when planning a new home. ASHPs serving individual rooms may be used to replace and/or reduce heat from existing sources. Even if existing HVAC equipment is in good shape, both will reduce your GHG emissions but neither may significantly reduce your utility costs. Presently available GSHP units do not work with hot water baseboards or radiators.

While installing an ASHP may be relatively simple, incentives for ASHP are at this time (2022) minimal (see below for links to them). If installing as individual room units, costs range from $3,000 to $5,000 per room. For a central whole-house system, get written contractor proposals.

Installing a GSHP may be affected by exterior conditions, such as ground slope, sub-surface conditions, and your underground utilities (e.g., water, sewer, and/or gas piping). For approximate pricing on a GSHP system, use the State-sponsored tool at https://geopossibilities.ny.gov/ It shows annual savings and the breakeven point where the system could pay for itself. Under its “Additional Data”, find the approximate cost without financial incentives. Con Edison says an average incentive is about $21,000. At present (2022), a federal tax credit of 26% is also available. For a typical, $30,000 system, it could reduce your federal income tax by ~$8,000. Together, they could cover most of the total cost.

Heat Pumps In Croton

When considering a heat pump in Croton, keep in mind the following conditions:

- Croton is not affected by the natural gas moratorium that presently covers other parts of Westchester County. Financial incentives may be higher in those areas.

- For homes presently heated by natural gas, heat pump savings may be much lower than for homes (and their water heaters) that are instead heated by fuel oil or propane.

- A portion of Croton sits atop our aquifer (i.e., source of drinking water). It lies below (approximately) the area north of Black Rock Park between the Croton River and the Croton Arboretum. In that area, building permits for ground-source heat pumps that require deep drilling may not be granted.

Utility Incentives and Federal Tax Credits

Paperwork for utility rebates should be handled by the contractor, as per your written contract. Tax credit paperwork is handled by the homeowner.

ASHP rebate https://sustainablewestchester.org/energysmarthomes/air-source-heat-pump/#incentivesandrebates

GSHP rebate https://sustainablewestchester.org/energysmarthomes/geothermal-heat-pump/
Note: many homes built before 1980 have peak heating loads between 30,000 and 50,000 Btu/h.

For the 26% GSHP federal tax credit, go to https://www.irs.gov/pub/irs-pdf/i5695.pdf

HPWH rebate https://sustainablewestchesterga.org/heat-pump-hot-water-heater/

For the $300 HPWH federal tax credit, a HPWH is a “residential energy property” (enter its cost on line 22a); go to https://www.irs.gov/pub/irs-pdf/i5695.pdf

To Find A Local HP Contractor

Use the pre-vetted list at https://sustainablewestchesterga.org/installer-partners/

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